REMARKS

Claims 1-48 are pending in this application. Non-elected claims 8, 9, 13-30 and 32-48 are withdrawn from consideration.

I. Telephonic Interviews

Applicants appreciate the courtesies extended to Applicants' attorney by Examiner Ip during the telephonic interviews held March 11, 2010 and June 24, 2010.

On March 11, 2010, Examiner Ip agreed that the objection to claims 11, 12 and 31 in the Office Action of January 27, 2009 has been withdrawn. Further, claims 1-4, 7, 10, 11 and 12 were rejected under 35 U.S.C. § **102(b)** as being anticipated by Kim et al. in the Office Action of January 27, 2009, but this rejection was not repeated in the final Office Action of October 28, 2009, although the Kim et al. reference is mentioned in the rejection under 35 U.S.C. § **103(a)** on page 5 of the Office Action of October 28, 2009. Accordingly, Applicants respectfully request the Examiner to withdraw the **§ 102(b)** rejection over Kim et al. in the next Official Action.

On June 24, 2010, Examiner Ip agreed to allow Applicants additional time beyond the expiration of the Suspension of Action to file a supplemental response to the Office Action of October 28, 2009 and the Advisory Action of March 11, 2010. Applicants thank the Examiner for the additional extension of time.

II. Double Patenting Rejections

The Examiner provisionally rejects claims 1-7, 10-12 and 31 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-4 of copending Application No. 11/943,207; provisionally rejects claims 1-7, 10-12 and 31 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 45-70 of copending Application No. 12/225,069; and provisionally rejects claims 1-7, 10-12 and 31 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-56 of copending Application No. 11/727,729.

Applicants respectfully request the Examiner to hold these rejections in abeyance, pending an indication that the claims are otherwise allowable.

III. Claim Rejection Under 35 U.S.C. § 102

The Examiner rejects claims 1-4, 7, 10, 11 and 12 under 35 U.S.C. § 102(b) as being anticipated by Abe et al. Applicants respectfully traverse the rejection.

Claims 1, 3 and 4 recite a "magnesium alloy **casting product"** comprising "a" atomic% of Zn, "b" atomic% of Y and a residue of Mg, wherein "a" and "b" satisfy expressions (1) to (3).

Although the reference does not disclose a "casting product", the Examiner asserts that casting does not exclude rapid solidification. Applicants respectfully disagree.

One of ordinary skill in the art would recognize that, as evidenced by a dictionary definition, "casting" is an object made by pouring liquid metal into a mold (i.e., a specially shaped container). For example, Cambridge Dictionary defines a cast as "an object made by pouring hot liquid into a container and leaving it to become solid" (see http://dictionary. cambridge.org/define.asp? key=11789&dict=CALD&topic=models-and-moulds).

In contrast, rapid solidified powder metallurgy processing (rapid solidified ribbon-consolidation processing) does not use a mold. Therefore, the rapid solidified powder metallurgy process disclosed in the Abe et al. reference is not "casting". Thus, casting excludes rapid solidification.

In the Advisory Action, the Examiner states that the instant claims are "product" claims and not "process" claims. However, "casting" produces a completely different product from a product made by rapid solidified ribbon-consolidation process, as disclosed in the Abe et al. reference. Applicants submit herewith a Declaration Under 37 CFR 1.132, which shows how the magnesium alloy casting product of the present application is different from the product made in the reference.

Example 1 (comparative) corresponds to a product made by the Abe et al. reference. Fig. 1 shows a TEM (Transmission Electron Microscope) image of the rapidly solidified ribbon-consolidated $Mg_{97\%}Zn_{1\%}Y_{2\%}$ alloy of Example 1, and the average crystal grain size of the rapidly solidified $Mg_{97\%}Zn_{1\%}Y_{2\%}$ alloy is about 300 nm (**0.3 μm**).

On the other hand, Example 2 is a high strength and high toughness magnesium alloy casting product, as in claim 1 of the present application. Fig. 2 shows an OM (Optical Microscope) image of the $Mg_{97\%}Zn_{1\%}Y_{2\%}$ alloy casting product of Example 2, and the average crystal grain size of the $Mg_{97\%}Zn_{1\%}Y_{2\%}$ alloy casting product is about **400 μm**.

Accordingly, the claimed magnesium alloy **casting** product has an average particle size of **400 µm**, whereas a product made by a rapid solidified ribbon-consolidation process, as disclosed in the reference, produces a product having an average crystal size of only **0.3 µm**. Therefore, the claimed product has structurally different features from those of the reference.

Moreover, Example 3 in the Declaration is a high strength and high toughness magnesium alloy comprising a plastically worked product, as in claims 3 and 4 of the present application. Fig. 3 shows an OM image of the extruded $Mg_{97\%}Zn_{1\%}Y_{2\%}$ alloy of Example 3, and the average crystal grain size of the recrystallization region of the extruded $Mg_{97\%}Zn_{1\%}Y_{2\%}$ alloy is about **4 µm**.

Accordingly, a magnesium alloy comprising a plastically worked product which is produced by preparing a magnesium alloy **casting** product has an average particle size of **4 µm**, whereas a product made by a rapid solidified ribbon-consolidation process, as disclosed in the reference, produces a product having an average crystal size of only **0.3 µm**.

Accordingly, the claimed casting products are clearly different from the product disclosed in the reference, as they have structurally different features.

Therefore, the reference fails to disclose a "magnesium alloy **casting** product", as recited in claims 1, 3 and 4.

Accordingly, claims 1, 3 and 4 are not anticipated by the reference.

Claims 2, 7, 10, 11 and 12 depend directly or indirectly from claim 1, 3 or 4, and thus also are not anticipated by the reference.

IV. Claim Rejections Under 35 U.S.C. § 103

A. Abe et al. in view of JP 05306424

The Examiner rejects claims 5 and 6 under 35 U.S.C. § 103(a) as being unpatentable over Abe et al., and further in view of JP 05306424 (JP '424). Applicants respectfully traverse the rejection.

The arguments above regarding Abe et al. are also applicable to this rejection. Accordingly, the reference does not teach or suggest a "magnesium alloy casting product".

Moreover, the Examiner admits that the Abe et al. reference does not teach hcp-Mg phase grain size and dislocation density, as recited in claims 5 and 6 (see October 28, 2009 Office Action, page 5, lines 9-10). However, the Examiner asserts that JP '424 discloses that the Mg matrix average grain size is limited to 5 μm, and that this disclosure is in the same field of endeavor as the claimed invention. Furthermore, in the Advisory Action, the Examiner asserts that the claimed grain size is conventional in view of JP '424. Applicants respectfully disagree.

The average grain size of claim 5 is not conventional in view of JP '424, because the cooling rate disclosed in the reference shows that it is not "rapid" solidification.

Paragraph [0014] of the machine translation of the reference states the following:

> The magnesium machine alloy of this invention can be obtained by carrying out the rapid solidification of the molten metal of an alloy which has the above-mentioned presentation with a melt quenching method. This melt quenching method means the method of making the fused alloy cooling quickly, for example, is effective, and an about [102-108K/sec] [i.e., **10^2-10^8** kelvin/second] cooling rate is obtained by these methods. [of a single-roll process, a twin-roll process…] In order to manufacture thin band material with this single-roll process, a twin-roll process, etc., a molten metal is spouted on steel rolls, 30-300mm in diameter, for example, copper, which is rotating through a nozzle hole at the rate of [fixed] the range of about 300-10000 rpm or. Thereby, width can obtain easily various about 5-500-micrometer-thick thin band material at about 1-300mm…

Moreover, paragraph [0018] of the reference teaches that the average crystal grain diameter is 5 μm or less.

Therefore, the average grain size of a rapidly solidified Mg alloy disclosed in JP '424 is 5 μm or less; the cooling rate of the rapidly solidified Mg alloy is **100-100,000,000 kelvin/second**; and the thickness of the thin band material of the rapidly solidified Mg alloy is 5-500 μm.

Applicants submit herewith technical literature by Suzuki et al. explaining the relationship between the thickness and the cooling rates of samples of rapidly solidified magnesium alloy provided by a roll process. Applicants also submit a partially translated version of Figure 2.10 from page 18 of the reference.

The samples are $Fe_{40}Ni_{40}P_{14}B_5$ alloys. By the roll process, the thickness of samples of rapidly solidified alloys depends on circumferential speed of the roll, and the cooling rates of rapidly solidified alloys are dependent on the thickness of the samples. Therefore, the cooling rate can be determined from the thickness of the samples.

The cooling rates of the samples of the $Fe_{40}Ni_{40}P_{14}B_5$ alloys are shown in Fig. 2.10. There are not many differences between the cooling rates of the samples of the $Fe_{40}Ni_{40}P_{14}B_5$ alloys and the cooling rates of the samples of the magnesium alloys. The cooling rate of a sample thickness of 500 μm provided by a copper roll process according to figure 2.10 is more than 10,000 kelvin/second.

Therefore, the cooling rate of the 100 kelvin/second of the solidified Mg alloy disclosed in JP '424 is not rapid. The average grain size of 5 μm or less, which is disclosed in JP '424, relates to Mg alloys that were not rapidly solidified. Thus, the average grain size disclosed in JP '424 does not apply to a magnesium alloy casting product. Therefore, JP '424 does not establish that an average grain size of 5 μm is conventional for Mg alloy casting products.

Accordingly, claims 5 and 6 would not have been obvious over Abe et al. in view of JP '424.

[On page 5 of the Office Action of October 28, 2009, the Kim et al. reference is mentioned in this rejection. However, this reference does not remedy the deficiencies identified above, and the claims are patentable over this reference for the reasons provided in the response filed June 15, 2009.]

B. <u>Abe et al. in view of Fisher</u>

The Examiner rejects claim 31 under 35 U.S.C. § 103(a) as being unpatentable over Abe et al., and further in view of Fisher (US 3,334,998).

The arguments above regarding Abe et al. are also applicable to this rejection.

Fisher fails to teach or suggest a "magnesium alloy casting product", as recited in claims 1, 3 and 4. Accordingly, Fisher fails to remedy the deficiencies of Abe et al.

Claim 31 depends directly from claims 1, 3 or 4, and thus also would not have been obvious over the references.

V. Conclusion

For these reasons, Applicants take the position that the presently claimed invention is clearly patentable over the applied references.

Therefore, in view of the foregoing amendments and remarks, it is submitted that the rejections set forth by the Examiner have been overcome, and that the application is in condition for allowance. Such allowance is solicited.

Respectfully submitted,

Yoshihito KAWAMURA et al.

By /Andrew B. Freistein/

Digitally signed by /Andrew B. Freistein/
DN: cn=/Andrew B. Freistein/, o=WLP, ou=WLP, email=afreistein@wenderoth.com, c=US
Date: 2010.07.16 12:56:24 -04'00'

Andrew B. Freistein
Registration No. 52,917
Attorney for Applicants

ABF/emj
Washington, D.C. 20005-1503
Telephone (202) 721-8200
Facsimile (202) 721-8250
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